



NOVEMBER 1987

COLORADO SPRINGS,
COLORADO

PIKES PEAK RADIO AMATEUR ASSOCIATION, INC.

P.O. Box 16521
Colorado Springs, CO 80935

FIRST CLASS MAIL



Ø BEAT



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ZERO BEAT is published monthly in the interest of the members of the Pikes Peak Radio Amateur Association, Inc., P.O. Box 16521, Colorado Springs, Colorado 80935. Cost is 50¢ per month for non-members or a \$4.00 per year subscription. Permission is given to reprint articles or excerpts provided credit is given. Deadline for submission of articles is the 21st of the month. Classifieds accepted anytime.

The Pikes Peak Radio Amateur Association meets on the second Wednesday of each month at Giuseppe's Depot Restaurant at 10 S. Sierra Madre at 7:30 p.m. All amateurs and interested parties are invited to attend.

Editor: Keith Goobie NYØT, 5335 Coneflower Ln., Colorado Springs, CO 80917 637-1525

A NEW HAM STORE IN THE SPRINGS

by Keith NYØT

In the course of the last two weeks, a new Ham Radio store has been taking shape in the Springs in the name of CW ELECTRONICS. It is a branch store from that of its parent located in Denver and it carries a wide line of electronic equipment and supplies as well as it has about one quarter of its facility dedicated to amateur radio.

Why am I saying anything at all about this place? For those that are the die-hards, this revelation is old hat - for the newcomers, this is to let you know that there is another place where you can fulfill your acquisition desires. But this is not the point I really would like to make. I am a newcomer to the area and from my discussions with the long time residents, other ham stores have been here before and have ultimately met their demise due to lack of continuing business.

It is not my intent that you the reader should dedicate all your business to this facility, as we certainly have quite a few other vendors that have taken interest in our publication and have shown that by advertising here. They are indeed worthy of your patronage as well. All that I wish to say is that this business is certainly worth a look when you are considering the purchase of your next piece of amateur radio gear. It will be only through your business that any ham facility will be able to stay in operation and it is certainly my desire that we should have a local facility.

For those of you that may not be aware, CW ELECTRONICS will be hosting an ICOM day on 14 November 1987 as part of their Grand Opening Sale. It will last from 9am to 5pm with a special in-store drawing to occur each hour. The grand prize will be a an IC-900 segmented radio system. Hope to see you all there.

That is all for this month. I hope that I may continue to enjoy the outstanding support that you all gave to Phil in the past. Until next time, may the rare one not escape your grasp!

73 ... Keith

NOVEMBER MEETING

The next regularly scheduled meeting of the Pikes Peak Radio Amateur Association will be held on *Wednesday* November 11 at 7:30 pm at Giuseppe's Depot at 10 S. Sierra St. The program will be the creation of circuit boards with the aid of a photo copier.

FOR SALE

Kenwood TS 530-S c/w
MC50 microphone and
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Call Harley KC8TQ
634-4555

VIEW FROM THE PEAK

by George Hinds, N8CIX

In early October I was in Michigan (and thus not present at the PPRAA meeting). One purpose of my journey was to ride, once again, over railroad tracks that years ago I worked on.

A new shortline railroad now operates over what was once New York Central tracks in that area, and a passenger special had been arranged by a railfan club; it was the first passenger train over that line in 30 years. To me, it was a chance to relive a part of my earlier life and so the wife and I were there.

Now the purpose of this item is not to make railfans out of ham radio operators; it is to tell you how hams in that part of Michigan combine the fun of riding the rails with amateur radio while doing a fine job of public service, too.

As we arrived to board the train, I recognized an amateur from the Detroit area whom I had known years ago when I was active on repeaters there. In talking to him I discovered that there were to be a half-dozen amateurs on the train that day, complete with walkie-talkies. They had volunteered to provide communications for the railfan group in operating this non-profit trip and, in so doing, to enjoy a day of riding the train through the fall scenery in central Michigan.

Well, it worked out very well. I listened to the help they gave during the trip and it certainly made things go smoother and even safer for all.

Railroad radio, of course, was used for the actual operation of the train by the railroad crew. The hams helped with passing traffic as to loading and unloading passengers, supplies, photo stops, passenger questions and incidental matters that arose and required prompt handling by the railfan group.

They had a great day and a fine ride (free) and the railfans were able to operate with greater safety and better service.

ARE HAMS GETTING MIKE-SHY?

While on this trip to Ohio and Michigan (and Ontario) I made it a practice to run the 2-meter (and sometimes the 220 and 440 rigs) in scan mode just to see how much activity was present.

Well, friends, something is happening. Where a few years ago the traveling ham could be sure of making a contact easily on almost any repeater cross-country, it's not so today. Day and time do influence activity, but the fact remains that today calls go unanswered where a few years ago contacts could easily be made.

What happened? Too few of us willing to extend ourselves a little to make friends, handle highway safety calls and keep a buddy awake and alert? Or does the number of repeaters spread the users too thinly to "mind the store?"

Another point to ponder: I expected to find increased 220 MHz activity now; not so except in Detroit where the band was busy. Quite possibly the threat (again) to take away a part of 220 has stopped new activity.

73, George N8CIX

ANTENNAS
By Chris Smith
NXØE

This month I will begin to take a look at MININEC3, the antenna analysis code available for personal computers. I hope to write a series of columns describing its purpose, development and use. If you find this to be of interest, you may want to obtain a copy of this code and follow along.

MININEC3 falls into a curious gray area of computer codes. It is public domain because it is not copywrited and was developed in part with government funds. However, its distribution is restricted to US nationals who submit requests for it; foreign nationals must request it through diplomatic channels! I suppose this is because it is considered "high technology" even though it is a fairly straightforward BASIC program. Copies of the code seem to be widely available. Nevertheless, at last report the code is still restricted, and as ridiculous as that seems, I will observe the restrictions. (In consideration of our VE friends, I will be glad to assist them in writing to the proper authorities to obtain permission to get a copy.)

So for the US nationals out there, I have copies for the IBM PC or clones, and for the Atari 520/1040 ST. If you are ambitious, I have source code in Microsoft Basic, Pascal, and C. With some adapting and debugging, the code should run well on any computer with the power of an IBM PC or more. The PC versions run with compiled BASIC and the Atari version is compiled LDW BASIC.

Updates for the code are distributed through the Applied Computational Electromagnetics Society (ACES), and I will pass them on to those to whom I have given copies. The documentation is also distributed by ACES, though I have a copy to lend to

those who can arrange to make a copy for themselves.

The credit for developing MININEC (versions 1, 2 and 3) belongs to Jim Logan of the Naval Ocean Systems Command. He thought that it should be possible to write a much simplified version of the "granddaddy" of EM codes, the Numerical Electromagnetics Code (NEC) of Lawrence Livermore Lab. Indeed it was possible, and MININEC was originally written to squeeze on to a 64K Apple II. Solutions were long and laborious, but it worked. Since then, the code has even been downsized to fit on an HP handheld calculator (this version being dubbed MICRONEC). The IBM PC had the additional computing horsepower needed to turn the code into a serious tool for antenna analysis and so MININEC3 was a major re-write in BASICA. Unfortunately, BASICA has a 64K data space limitation, and the program only runs at full size if it is compiled. By the way, Jim Logan is a ham with a floating shack that, I believe, sails from San Diego to Hawaii on occasion.

Next month I plan to discuss the purpose of a code like MININEC. In the meantime I hope to complete my rhombic- I'm ashamed to admit that for the last 6 months my only antenna has been a two meter J-pole! This rhombic should work on 40 through 10 meters, and if the Novices are kind, I may learn to work CW again. The development of the antenna has taken all sorts of odd pieces and parts, and I've found OEM Parts to be invaluable in having most of them on hand and at a good price. They are a great asset in developing a good junk box, especially if you don't mind cleaning up used but servicable parts. They support PPRAA, so you may be lucky enough to win one of their \$20 gift certificates in the monthly raffle.

CONGRATULATIONS

To Cathie Richie
Peggy Lundebj Bruce Lundebj
Donna Landry Saralee Hosea

For passing their Novice
Exams following the classes
Directed by Harley KC0TG

VHF & ABOVE NEWS
by NKØP

With increasing solar flux activity I suspect some of you are getting close to VUCC awards on some of the VHF/UHF/Microwave bands. Since I started reviewing QSL cards and applications for these certificates I thought it worthwhile to go over some of the areas we check when you sent the cards to the awards manager.

to review: VUCC is 100 Grids on 50MHz, 144MHz and 220MHz; 50 Grids on 432MHz; 25 Grids on 902MHz and 1296MHz; 10 Grids on 2304MHz; 5 Grids on everything higher.

Only contacts dated January 1, 1983, and later are creditable for VUCC purposes. No crossband contacts are permitted. QSO's with aeronautical mobiles do NOT count. No contacts through ACTIVE "repeater" or satellite devices or powered relay methods are permitted. Contacts with stations on shipboard (located on a body of water do NOT count.

For VUCC awards on 50 through 1296MHz, all contacts must be made from a location or locations within the same grid square or different grids no more than 50 miles apart. For SHF awards contacts must be made from a single location, defined as within a 300 meter circle.

Requests must be submitted to an approved VHF awards manager for certification. DO NOT send cards to ARRL Headquarters.

Cards that have the date, callsign, or band altered in ANY way are not accepted. No judgement is made as to who may have altered the card.

If you send your cards through the mail be sure to include enough money to cover return postage and insurance. If anyone needs more detailed info or has questions I have all the required forms and more detailed instructions. I also have a world wide grid map for any "rare DX".

73's and C U on the bands....

RON NKØP



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"BUT HOW DO I GIVE MY
GRID LOCATOR AT THE
NORTH POLE?"



GRID SQUARES

Rick Brown, KDØSV

Grids or grid squares are terms that are commonly heard on VHF these days. Do you know what your grid is? Or, do you even know what a grid square is? VHF operators in Europe had a system of grid locators for many years. Unfortunately the system could not be expanded to the rest of the world without causing some confusion. Because of this, the Maidenhead locator system was developed to cover the entire world without any problem. This system was adopted by the Central States VHF Society, and by the ARRL in 1983.

The Maidenhead system divides the earth into 324 different fields. Each field is 20 degrees in longitude by 10 degrees in latitude, and each is given a two letter designation from AA to RR. The system starts with AA at the South Pole and the 180th parallel. The first letter increases for each 10 degrees you move east and the second letter increases for each 10 degrees of north movement. Each field is further divided into 100 sections called grid squares or grids. These are numbered 00 through 99. Thus a grid square is designated by four characters. For example, Colorado Springs is located in DM78. If you really want to specify a location, the grids can be further broken down by two more letters into an area about three by four miles square. Obviously, you need to know your exact location by latitude and longitude to do this.

What purpose are the grid squares anyway? Well, for one thing, they are a way to let other amateurs know where you are located. Another use of grid squares is for awards programs. The ARRL has a VHF/UHF counterpart to DXCC in the VHF/UHF Century Club (VUCC). On six and two meters this award can be earned by confirming contact with amateurs in 100 different grid squares. On higher

frequencies fewer grids are needed, but the challenge is just as great. Grid squares are used on the HF bands as well, and SM5AGM compiles a list of those who have submitted a list of fields worked from 160 meters to 10 GHz. Working all 324 fields would be extremely difficult since 54 of the fields cover ocean areas only.

There are various ways to determine your grid square, from using a map put out by the ARRL to using a computer program. Any way you do it is important to know your latitude and longitude to be exactly correct. One of the hardest parts of obtaining any of the awards sponsored by the ARRL is not making the contacts, but getting the QSL cards. I am currently working on a program to help keep track of grids worked and confirmed. The program is written in Pascal, and uses dynamic memory allocation. That means you don't have to define how many grids you are going to store before you start using the program. If there is interest I will write another article on how the program was developed.

If you want to learn more about grid squares I have included a list of articles that will give you more information. Learn your grid square, some one out there may want to know it.

REFERENCES

1. John F. Lindholm, W1XX, "VHF/UHF Century Club Awards," QST, January 1983, page 49.
2. Joe Reiser, W1JR, "VHF/UHF World," Ham Radio, July 1987, page 38.
3. Folke Rosvall, SM5AGM, "Locator Field List," Ham Radio, July 1987, page 74.



OEM PARTS

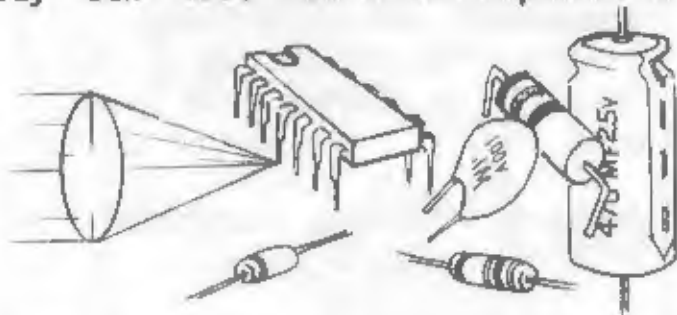
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SEE DICK PEACOCK OR BOB TAYLOR

NO FEAR OF SILENT KEY

*I sit quietly in my shack
While reading my QST
Noting the names and call-signs of
Those recorded as "Silent Key".*

*Knowing they're no longer in
My world of Ham Radio
While I recall the camaraderie proffered
To me by their QSO.*

*I sadly search through my QSL's
Re-reading their cards to me
Reflecting the enjoyment each one gave
To W0DALE.*

*And so I send a "Silent CQ"
By prayer for them that day
Knowing it will be answered and
To help them on their way.*

*As one day I'll hear my "CQ"
From the Good Lord I love
I'll have no fear - nor shed a tear
I can QSO again with "Silent Keys" above.*

*I hope to arrive at that "Golden Gate"
And hear "Silent Keys" say to me,
"Bill, your silent prayer we copied Q-5
Welcome to the group, W0DALE".*

Faye KB0QI

ABOUT TWO MONTHS AGO, I WROTE AN ARTICLE ON "TAKE OFF ANGLES FOR A HORIZONTAL ANTENNA. AT THAT TIME I TOLD YOU HOW THAT WAS CALCULATED AND THAT THE PROGRAM WAS AVAILABLE ON DISK FOR THE TI-99-4/A COMPUTER.

I HAVE JUST COMPLETED THE PROGRAM FOR IBM MACHINES/CLONES/COMPATIBLES ACCEPTED. I AM CURRENTLY WORKING ON A DISK OF SEVERAL FREWARE PROGRAMS THAT ARE USEFUL TO AMATEURS. FOR THOSE OF YOU WHO ARE INTERESTED, IF YOU WILL BRING A DISK TO THE BREAKFAST ON SATURDAY MORNING, I WILL MAKE A COPY FOR YOU OF THESE USEFULL PROGRAMS.

I DO NOT HAVE A MODEM, YET, BUT THAT WILL COME IN THE FUTURE, IF I HAVE TIME. CHANGING OVER TO A NEW SYSTEM ALWAYS REQUIRES TIME TO GET USE TO IT. I LIKE TO BUILD UPON THE BASE SYSTEM SLOWLY. RIGHT NOW I'M JUST GETTING USE TO THE NEW SOFTWARE. I HAVEN'T USED AND IBM SYSTEM FOR SOME 12 MONTHS. IT'S KIND OF LIKE MAKING A CW CONTACT AFTER NOT HAVING DONE SO IN SEVERAL YEARS, NOW WHAT WAS "Z"...

NEW SUBJECT: LAST NIGHT I WAS RAG CHEWING WITH A LOCAL ON UHF AND WE TALKED ABOUT BUILDING VARIOUS ITEMS IN AMATEUR RADIO. I BROUGHT UP THE SUBJECT OF VLF OPERATION AND HE TOLD ME, HE HAD FORGOTTEN ABOUT THE 1800 METER BAND, I WONDER IF THER ARE ANY NUTS LIKE ME, WHO ARE INTERESTED IN PLAYING ON VLF HERE IN THE LOCAL AREA. I HAVE THE RADIO TO DO IT WITH, ALL I NEED TO DO IS MAKE THE ANTENNA WITH THE BIG COIL..IF YOU ARE INTERESTED AND ARE WILLING TO WORK AT IT, GIVE ME A CALL AT 591-2703. OR MENTION IT AT THE BREAKFAST ON SATURDAY MORNING IF YOU ARE THERE.

NEW SUBJECT: SOME AMATEURS ADD ADJECTIVES AND METEPHORS ETC. TO THEIR CONVERSATION, WHEN THEY REACH THE END OF THEIR CONVERSATION AND THEY REALLY DON'T HAVE ANYTHING MORE TO SAY RELATING TO THE SUBJECT. ie; AHHH, AND ALL, SOFORTH, LETSSEE, JUST TO NAME A FEW. RECOMMENDATION, WHEN YOUR THROUGH, FINISH WITH WORDS LIKE, OVER, OUT, OR NOTHING ELSE. BEING DIRECT HAS A STRANGE WAY OF GETTING TO THE POINT, AND SAVING AIR TIME, IN AN EMERGENCY....73'S KD0SO

The Radio Shack "Novice Voice Class"
Package - A Personal Experience
By Jay Shaffer(Soon-to-have-a-callsign)

I have just finished taking the Radio Shack "Novice Voice Class" course and, as a result, have just passed my Novice Class License exam.

At 33, I have been wanting to get into Amateur Radio for about 20 years but somehow never quite made it. I knew about 5 letters of code.

The package consists of a booklet which gives you all 300 questions from which your examination questions will be chosen. It also serves as a guide to the entire course. Additionally you get two cassette tapes, each of which is recorded on both sides for a total of 4 code-practise 'tracks'.

I spent about 2 hours per night on the first 4 nights, running through one side of one cassette and reading the entire group of questions. By the fourth night, I had advanced to the fourth tape track (the final one) and was getting better than 90% of the test questions. Starting the fifth night, I listened to the last side of the tape once through, and went through the entire list of 300 questions each evening (which consumed about an hour and a half each evening). At the end of the first week, I purchased an Amateur Band radio at Miley's Radio in Florence and began to attempt to copy real QSO's of the air. I had no trouble finding ULTRA-SLOW code to copy on the Novice portion of the 40-meter band, and was able to transition from the tapes to copying off the air.

Exactly two weeks after starting the course, I took the exam at Harley Hansen's QTH and passed the code test 100% and the theory test with one mistake (there is apparently a mistake in the book; the transmitter circuit block diagrams should show power supplies!)

My overall impression of the course is very favorable; I believe that you are getting a pretty good value for \$19.95 and it really can work. I'm looking forward to my first QSO in a couple of weeks!

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Call Ron NKOP 593-8352

AMATEUR RADIO LICENSE EXAMINATIONS

WHEN: Sat, 14 Nov 87 at 9:00 AM
WHERE: First United Methodist Church
420 N. Nevada Ave.
Colorado Springs, CO
WALKINS: Allowed
TALK-IN: 146.37/97

NEEDED

1. Original FCC license, if any
2. A copy of your FCC license, if any
3. Two forms of positive identification
(driver's license, birth certificate,
passport or library card)
4. \$4.35 check or M.O. payable to
ARRL/VEC
5. Completed FCC form 610
6. If physically handicapped, a
physicians certificate describing the
nature of the disability. Arrangements
should be made prior to testing

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MINUTES OF OCTOBER GENERAL MEETING
submitted by Al NØCMW, secretary

The general meeting of the Pikes Peak Radio Amateur Association was held at Giuseppe's Old Depot Restaurant, Wednesday evening 14 October 1987. The meeting was called to order by the president Don KEØGJ at 19:30.

The minutes of the previous General Meeting and Board meeting were approved as printed in Ø-Beat.

Committee Reports

Note: Anyone wishing to help out on any of these committees, please contact the chairman at the phone number listed. Thank you for your support.

Treasurer - Bud NØDDF (599-7699):
Previous balance was \$1690.94, income of \$300.78, expenses of \$119.73 leaving a balance \$1871.99.

Interference - Ron NKØP (593-0352):
Working on local FCC interference complaint.

Education - Harley KCØTQ (634-4555):
Novice Classes are doing fine with eight students. Will conduct test on 30 Oct 87. Will start up Tech/General classes, but will need assistance.

Publicity - Jim WA9ABB (598-7543):
Was down at Channel 11 studio to be interviewed for a show on Amateur Radio. Expect it to be on the air around Nov 7 at 11am.

Colorado Council of Amateur Radio Clubs (CCARC) - Bud NØDDF (599-7699):
Nil

Deaf and Blind School - Jim WA9ABB (598-7543): Need volunteers to assist in instructing the students who require one on one training. Will need assistance when school gives permission to install antennas.

Ø-Beat - Phil VE1ARC (590-7136):
The outgoing editor thanks to all who supported him while he was the editor.

ARES - Al NØCMW (473-1660):
The ARES Net meets each Wed evening at 1900 local on the 37/97 repeater with 16/76 and 6.520 simplex as backups.

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TAB BOOKS

Public Service - Mike KØTER (636-1290):
Nil

Old Business:

Received a letter from the Tripoli Rocket Association thanking us for helping with the rocket launch with such a very short notice. They could not have done it without our communications to the FAA.

Received a letter from the local Barbershop Quartet thanking us for our assistance during their function.

New Business:

The number for Bdale's Ham BBS has been changed and it is now 495-2061.

Tom ADØO announced a voice contest Oct 24/25 CW Nov 28/29 and commented on some openings that he had on 10 m during the last couple of days.

Don KEØGJ read a letter from a Handicapped Ham (KØYPD) requesting help. Chris NKØE will investigate.

Jim WA9ABB asked to be relieved as publicity chairman as other duties conflicted with him doing a proper job.

Ron NKØP suggested a mini-auction, but proposal was not met with too much enthusiasm.

Elections were tabled with no nominations from the floor, so a motion was to elect by acclamation the following people as recommended by the Board.

President	Ron	NKOP
V. President	Keith	NYST
Treasurer	Bud	NDDF
Secretary	Al	NCHW
Board Member	Ron	KAZHO
Board Member	Bdale	N3EVA
Currently Serving		
Board Member	Chris	NXE
Board Member	Nick	KG5N

Prizes - Keith NYST:

Winners were:

WDOSZ Don - Bumper Mount
WOMGT Doc - Operators Manual
KAPXE Connie - OEM Gift Certificate
WB2EVR Bill - WINTRONICS Gift Cert.
N0HJT Doug - Books
KB0HW Lee - Bunch of old QSTs

Program:

Bdale N3EVA talked about the current and future expected uses of computers in the shack. It was well received and the subject of a good discussion after he presented it.

The meeting was adjourned at 2130

The next meeting will be 11 Nov 87.

MINUTES OF OCTOBER BOARD MEETING
submitted by Al NCHW

The board meeting was held on Monday 19 OCT 87 at the home of Al NCHW. Meeting was opened by President Ron NKOP at 1900 hrs. Present were Bud NDDF, Ron KAZHO, Bdale N3EVA, Al NCHW and Keith NYST.

Discussion was held on custodianship of club equipment. It was decided that the club custodian Mike KSTER would be in charge for storage of all club equipments.

As no one had stepped forward to organize the Xmas party this year, there will be not be one. A special meeting for December is planned with special prizes to be looked after by Keith NYST.

The board voted to fix the handheld belonging to Frank KAPYPX. This was the one that was won by Ron KAZHO and was subsequently donated to Frank.

The board voted to send \$100.00 to support the Boulder antenna fund, so that they could take their case to federal court.

The board voted to increase the number of #Beats to 325 due to increased membership and advertisers.

Chris NXE discussed plans for the completion of the D&B antenna project. It is planned for Oct 31 after the morning breakfast.

The lineup for future programs was discussed. Tentatively scheduled are:
Nov - Circuit Boards

Discussion was held on a trailer for the propane powered generator. Investigation will be completed on the availability of a reasonably priced system.

It was identified that people will be needed to fill out the various club positions as spelled out in the by-laws. If anyone is interested, please let Ron NKOP know.

Next Board meeting will be at the House of Nick KG5N.

An unexpected visitor crashed the meeting in the name of Field Day Barney (KABALL) with his ball. He was quickly quieted by the dulcet tones of Bud NDDF.

There being no further business, the meeting was adjourned at 2100 Hrs.

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**      GATEWAY ELECTRONICS      **
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*      "Gateway's Got It"      *
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*      5115 N. Federal Blvd, # 32
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*      This coupon worth $2.00 off next
*      $15.00 purchase.
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MILEY'S RADIO

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Hours 9 to 6 Tuesday through Friday — Saturdays 9 to 1 — Evening Hours 7:30 to 10 (Call Ahead)
Closed Saturday 1 PM, Sunday & Monday
Closed Nov. 5-10 Odessa TX Hamfest
Nov. 28-Dec. 9 for Denver Hamfest - Jeffco Fairgrounds
and Dec. 5 & 6 Apache Junction, AZ

NEW EQUIPMENT IN STOCK

December TS140S Approx. \$795
1785 Kenwood TS 440S \$935 w/AT installed \$1085
Kenwood TS 940S \$1735, w/auto tuner \$1985.
Kenwood TS 430S \$745
Icom 735 \$835
Icom 751A \$1395
Icom 761 \$2100
Yaesu FT 757GX \$1350
Yaesu FT 757GX \$780
Yaesu FT 757GX Mk. II \$925.
More Kenwood, Icom, and Yaesu HF equip. & accessories at equally low prices.
New Kenwood TR 751A 2 meter all mode w/CasSfat preamp \$340.
Kenwood TM 2570A 70 watt 2 meter FM mobile \$498
Kenwood TM 2550A 45 watt 2 meter FM mobile \$425.
Kenwood TM 2590A 25 watt 2 meter FM mobile \$398.
Kenwood TM215A \$310.00.
Kenwood 211A \$300 (1 only)
Kenwood TM 215A \$310.
Kenwood TM221A-\$365 / 321A-\$380 / 421A-\$365.
Complete line of Tokyo High Power amps, preamps & tuners at lowest prices.
Icom 48A 440MHz \$423 - W/TTP.
Icom 28A-132-174 MHz scan/receive 25W \$395 W/TTP
Icom 28H-same specs as Icom 28A w/45W \$425 W/TTP
Icom u2AT \$255.
Icom 2AT HT \$255.
Icom 02AT \$297.
Icom 02AT w/BP7 5 watt battery & wall charger \$335.
Icom 4AT \$290.
Icom 04AT \$380.
Icom 3200A 2 meter/440 dual bander \$525.
Icom 275H 1 only \$1185.
Icom 475A 1 only \$1199.
Icom 900 Basic Controller \$510.
Daiwa Meters, Switches & Rotors - In Stock - The Daiwa rotor is great!!!
Mirage Amps - Low Prices - In Stock
KDK FM 240 mini 25W w/TIM & LCD display, encoder/decoder TO 156 MHz receiver \$320.
W/o tone \$300.
Yaesu FT 209RH 5 watt FM HT \$275. 1 only.
Yaesu FT 2700RH 2 m-70 cm dual bander full duplex \$490.
Yaesu FT 727R 2/70cm HT - New CPU \$410.
Yaesu FT 23R 2 Meter HT w/TT Pad \$265.
Yaesu FT 73R 70 cm HT w/TT Pad \$278.
Yaesu FT 211 RH \$398.
Ten Tec Corsair II HF xcvr. \$1195.
Ten Tec Paragon \$1720.
Tokyo Hi Power 37V 2-25 Gas Fet Preamp \$95.
Astron PS - ALL AMPS - Low Prices - Astron RS 50 and V50 In Stock
Weiz test meters in stock - all power levels and frequencies
New B & W VS 300 tuner-best 300W tuner for the price! Special \$94.
Hustler 58TV & 6 BTY In Stock. \$120/\$140.
All Butternut antennas at competitive prices.
RFZ and TE System Amps & PreAmps.
Nye Viking Power Monitor 5000W \$205.
Ameritron Amplifiers - All 80A - 1 3-500Z - In Stock \$795. AL84 4-6A/V6 \$395.
Ameritron remote antenna switch - RCS 4 & 8V - \$120.
AEA PK 232 data controller internal HF/VHF modem \$285.

Kantronics KAM all mode controller -
CW/RTTY/ASCII/AMTOR or Packet \$275. Updated Chip for IBM & KISS
(HF & VHF Packet)
Kantronics KPC4 dual port simultaneous connects, digipeating
& gateway on 2 VHF radio ports & RS 232/TTL port - Rec 220 MHz
TX145 MHz - \$295.
All Kantronics controllers & interface units in stock at lowest prices.
MFJ wet & dry dummy loads, tuners & keyers in stock.
MFJ 909B roller inductor tuner \$295.
MFJ 962B 5 KW tuner-160 to 10 meters \$195.
MFJ 980B 3 KW tuner \$150.
MFJ 1270B packet controller (PNC-2) \$125.
New MFJ 1274 RF/VHF swichable packet controller \$145.

USED EQUIPMENT

Kenwood TR 2400 - nice \$135.
Kenwood TS 520 \$350.
Kenwood AT 250 auto tuner \$225.
Kenwood TR2800A \$195.
Kenwood TS430S w/AM/FM/Mike \$600.
Kenwood VFO 230 digital - \$219.
Kenwood SP230 v/Filters - \$65.
Kenwood TR3600 440 MHz 2 HT \$195.
Kenwood FR7930 - Nice \$275.00
Used HF Amps - several in stock.
Icom 2AT \$135.
Icom 02AT \$250.
Icom 02AT w/mod \$275.
Yaesu FT708R 70 cm HT \$185.
Yaesu 757AT auto tuner \$225.
Yaesu FT 101E \$350.
Yaesu FT 757GX - Nice \$625.
Yaesu FL2100B \$400 - Nice
Yaesu FT 301 - 20W Mobile H.D. P/V, and external VFO
all for \$325.
Yaesu FT620B 6 meter \$275.00.
Drake TR7 w/PS2 Supply \$659.
Signal One - excellent condition - was Don Paynes personal radio.
Mods by Cunningham \$650. Call for more info in this rig.

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